

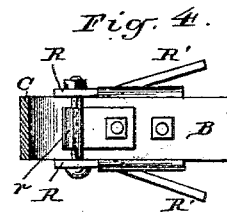
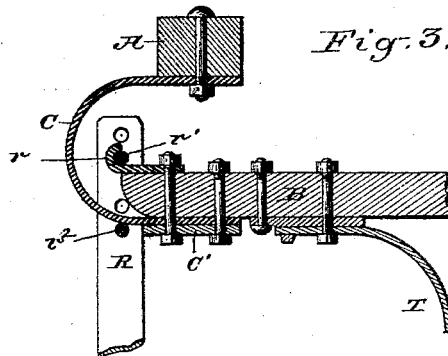
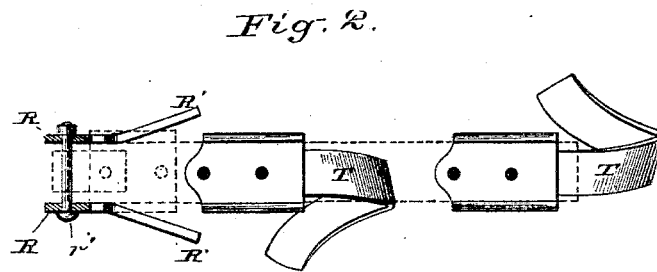
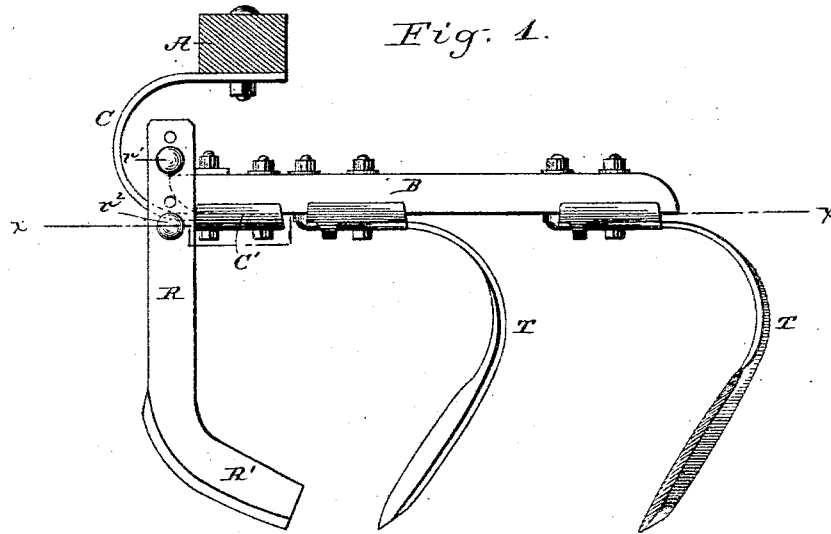
(No Model.)

E. E. WHIPPLE.

HARROW.

No. 303,902.

Patented Aug. 19, 1884.



Witnesses,
Jno. H. Stockett
C. C. Poole

Inventor,
Effinger E. Whipple
Per W. E. Dayton
Attorney.

UNITED STATES PATENT OFFICE.

EFFINGER E. WHIPPLE, OF EATON RAPIDS, MICHIGAN.

HARROW.

SPECIFICATION forming part of Letters Patent No. 303,902, dated August 19, 1884.

Application filed August 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, EFFINGER E. WHIPPLE, of Eaton Rapids, in the county of Eaton and State of Michigan, have invented certain new and useful Improvements in Harrows; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to clod-crushing devices for that class of harrows having a series of separate vibrating tooth-beams attached by spring-connections at their forward ends with the harrow-frame, such as is shown, for instance, in Letters Patent No. 248,373, granted to me October 18, 1881.

The invention consists in a construction whereby a vibrating movement is obtained in the crushers, and also in other matters, as hereinafter set forth, and pointed out in the claims.

In the drawings, Figure 1 is a side view of a tooth-beam attached by a spring to a harrow-frame and provided with clod-crushers in accordance with my present invention. Fig. 2 is a top view, partly in horizontal section, of the matters shown in Fig. 1, the beam and other parts being removed for the purpose of better showing the form and position of the crushing teeth or blades with reference to the pulverizing-teeth. Fig. 3 is a fragmentary view in central longitudinal vertical section of parts shown in Fig. 1. Fig. 4 is a fragmentary plan view of the front end of the tooth-beam and its attachments, the overhanging part of the connecting-spring being removed.

To first describe the particular construction shown, A is any portion of the main frame of the harrow to which the beam may be connected.

B is a tooth-beam attached at its front end to the frame A by the flat U-shaped spring C, of equal width with the beam, and provided with two oppositely curved and twisted teeth, T, constructed substantially as set forth in the above-mentioned patent.

C' is a cast plate overlying the spring C, and provided with upturned flanges at its sides, which embrace the spring C and extend over a portion of the sides of the beam B,

whereby the vertical bolts which pass through the plate, spring, and beam more effectively hold these parts rigid and in place.

R R are two vertical flat metal bars, which are applied flatwise to opposite sides of the beam B and spring C, in front of and in contact with the projecting edges of the plate C', being held firmly in this position by means of the hook-formed plate *r*, applied to the upper surface of the beam, and the transverse bolts *r*¹ and *r*², the former above and in the bend or hook of the plate *r* and the latter beneath the spring C. At their lower ends the bars R are rearwardly deflected, so as to each present a curved or sled-runner formed edge on its lower surface, which is sharpened suitably to readily enter and cut clods or lumps of earth which it may encounter. Said rearwardly-deflected parts or blades R' on the bars R are also preferably deflected laterally, as seen in Figs. 2 and 4, and the bars R are generally so set upon the beam B that the curved blades R' will enter the ground-surface to about the same depth as the teeth T.

Constructed as described, and set in the position shown, the crushers or blades are calculated to penetrate and divide large clods or lumps falling in their way, so that the teeth T may more easily further reduce or pulverize the fragments.

By means of a series of bolt-holes (shown in the bars or shanks R) to receive the bolts *r*¹ *r*² the blades may be adjusted to any desired vertical position. By attaching the bars R at the forward end of the beam B, and at a point adjacent to the spring C, a vibrating movement in said bars is allowed by the said spring, such vibrating movement being produced in part by the blades themselves in meeting with varying resistance in the ground, but in greater part by the action of the teeth T, located farther back upon the beam, which are, from such location, more easily and more widely swayed, and which therefore impart a violent trembling motion to the crushing-blades at their extremities. The resistance to the forward movement of the crushers, caused by their contact with the ground, will obviously tend, when the crushers are attached to the tooth-beams, to throw the lower ends of said crushers upwardly and backwardly, and to thereby lift the rear end of the said tooth-beam and the

teeth thereon from the ground; and an important part of the improved result obtained by attaching the crusher in the manner described arises from the fact that the crushers, being attached to the tooth-beam near the spring, operate with comparatively little leverage to lift the rear end of the tooth-beam, while at the same time the harrow-teeth, which are located at a much greater distance from the spring, act with a proportionately greater effect to cause a vibrating motion in the crushers.

The tendency of the crushers constructed as herein shown to throw the harrow-teeth upwardly is occasioned both by the rearward drag or pressure upon the crusher-blades and by the tendency of the rearwardly and downwardly inclined cutting-edges of the said blades to cause the latter to rise in passing over hard lumps and clods. It is found in practice, however, that the inclination of the lower edges of the crusher-blades tends, to a greater extent than the rearward pressure thereon, to interfere with the operation of the teeth; and by connecting the crushers at the extreme front end of the beam, as herein shown, the upward pressure mentioned—being exerted at a point very close to the spring—produces no appreciable effect upon the beam. The rearward divergence of the blades R' also contributes to the efficiency of the crusher-blades by enabling them to tear apart the lumps or clods with which they may engage.

I do not wish to be limited to the particular feature of construction herein shown, except in the specific claims therefor. The crusher-

blades may, for instance, be secured to the beam in other ways than herein shown, and the edges of the blades may be parallel, or both may be deflected to the same side. The crushers may, however, as a more desirable construction, be removably attached to the harrow, as is shown in the present instance, so that the harrow may be adapted for use with or without them, as particular cases may require.

I claim as my invention—

1. The combination, with a harrow-frame, a vibrating tooth-beam, and a spring joining the tooth-beam and the frame, of clod-crushing blades secured to said beam adjacent to the spring, substantially as and for the purpose set forth.

2. The combination, with a harrow-frame, a vibrating tooth-beam, B, teeth T, secured thereto, and a spring connecting the forward end of said beam with the harrow-frame, of crushing-blades secured to said beam at or near its forward end, substantially as and for the purpose set forth.

3. In combination with the tooth-beam B, spring C, blades R R', and stop C', the hook-formed plate r, and bolts r' r'', substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

EFFINGER E. WHIPPLE.

Witnesses:

A. C. DUTTON,
FRANK H. CLAY.